

REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is requested. Claims 2-13 and 21-28 are in this application. Claims 2, 3, 4, 5, 7, 9, and 12 have been amended. Claims 1 and 14-20 have been cancelled. Claims 21-28 have been added to alternately and additionally claim the present invention.

The Examiner objected to the drawings because reference number 339 is missing from FIG. 3. As a result, applicant proposes amending FIG. 3 to add reference number 339 as shown in red on a marked up copy of FIG. 3, which is attached in Appendix A. A replacement sheet including FIG. 3 is attached in Appendix B.

The Examiner also objected to the drawings because FIG. 3 does not show a hole with an L-shape as recited in claim 9. Applicant notes that hole 332, which is an L-shaped hole shown in applicant's FIG. 3, can be read to be the L-shaped hole required by claim 9. (See applicant's specification, page 4, lines 13-19.) As a result, it is believed that FIG. 3 shows an example of an L-shaped hole as required by claim 9.

The Examiner rejected claims 9-12 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claims 9 and 12, the Examiner indicated that it was unclear how the end of the tip of the outer metal shell is spaced apart from the electrode to form a gap.

Claim 9 recites:

"a conductive electrode having a first end and a spaced apart second end located in the channel, and

"wherein the outer metal shell has a tip that curves up and around to be directly over the first end of the conductive electrode such that an end of the tip is spaced apart from the first end of the conductive electrode by a gap."

Applicant's specification teaches:

"Conductive center electrode 310 has a first end 320 and a spaced apart second end 322. In addition, outer metal shell 314 is threaded for insertion into side wall 316, and includes a tip 326 that curves up and around to be directly over first end 320 of electrode 310 such that an end 328 of tip 316 is spaced apart from end 320 of electrode 310 by a gap 330." (See page 4, lines 1-6.)

Thus, from what applicant can determine, claim 9 is clear, and satisfies the requirements of the second paragraph of section 112.

In addition, the Examiner noted that the limitations "the conductive center electrode" and "the channel" lack antecedent basis. Claim 9 has been amended to correct these inadvertent errors. Thus, for the foregoing reasons, it is believed that claim 9 satisfies the requirements of section 112. In addition, since claim 12 depends from claim 9, claim 12 satisfies the requirements of section 112 that are satisfied by claim 9.

With respect to claim 10, the Examiner indicated that it was unclear how the hole has an L-shape.

Claim 10 recites:

"wherein the hole has an L-shape."

Applicant's specification teaches:

"In the example shown in FIG. 3, hole 332 is an L-shaped hole, although other shaped holes can alternately be used. L-shaped hole 332 begins at an opening 334 that lies adjacent to first end 320, and runs along a first line that is substantially parallel to the longitudinal axis of ceramic jacket 312 to a point 336 that lies on the outside of engine wall 316. From point 336, hole 332 runs perpendicularly away from the longitudinal axis to an opening 338 on the side of ceramic jacket 312." (See page 4, lines 13-19.)

Thus, from what applicant can determine, claim 10 is clear, and satisfies the requirements of the second paragraph of section 112.

With respect to claim 11, the Examiner indicated that it is unclear how a hole can be substantially straight.

Claim 11 recites:

"wherein the hole is substantially straight, and has an end region and a middle region that is wider than the end region."

Applicant's specification teaches:

"In the example shown in FIG. 5, hole 512 is a straight hole, which has an end portion and a middle portion that is wider than the end portion, that runs along a line that is substantially coincident with the longitudinal axis of ceramic jacket 510, although other shaped holes in other locations can alternately be used." (See page 9, lines 1-5.)

Thus, from what applicant can determine, claim 11 is clear, and satisfies the requirements of the second paragraph of section 112.

The Examiner rejected claim 1 under 35 U.S.C. §102(b) as being anticipated by Ingham (U.S. Patent No. 6,204,594). In addition, the Examiner rejected claim 1 under 35 U.S.C. §102(b) as being anticipated by Linder et al. (U.S. Patent No. 4,489,596). As noted above, claim 1 has been cancelled.

The Examiner rejected claims 1-3, 7, and 8 under 35 U.S.C. §103(a) as being unpatentable over Muller et al. (U.S. Patent No. 4,393,687) in view of Linder et al. Claim 1 has been cancelled, and claim 2 has been amended to be in independent form. Thus, for the reasons set forth below, applicant respectfully traverses this rejection as applied to claim 2, which recites:

“an insulating jacket having a hole that extends through the insulating jacket;
“an imaging structure located completely in the hole, the imaging structure converting photons into an electrical signal; and
“an outer metal shell that fits around and contacts the insulating jacket.”

In rejecting the claims, the Examiner pointed to insulation 10b shown in FIG. 1 of Muller as constituting the insulating jacket required by claim 2, and light guide cable 15 shown in FIGS. 1 and 3 of Muller and evaluation circuit 312 shown in FIG. 3 of Muller as constituting the imaging structure required by claim 2. Since light guide cable 15 does not appear to be located in insulation 10b as required by claim 2, applicant assumes the Examiner intended to read light guide rod 12 shown in FIGS. 1 and 3 of Muller to be part of the imaging structure required by claim 2.

Light guide rod 12 and evaluation circuit 312, however, can not be read to be the imaging structure required by amended claim 2 because claim 2 requires that the imaging structure, which is located completely in the hole, convert photons into an electrical signal. Specifically, although light guide rod 12 is located in the hole, applicant has been unable to find any discussion in Muller that teaches or suggests that light guide rod 12 converts photons into an electrical signal. In addition, evaluation circuit 312 is not located in the hole as required by claim 2.

Thus, since light guide rod 12 does not convert photons into an electrical signal, and evaluation circuit 312 is not located in the hole, claim 2 is patentable over Muller in view of Linder (which was cited by the Examiner as evidence that housings are made of metal). In addition, since claims 3 and 7-8 depend either directly or indirectly from claim 2, claims 3 and 7-8 are patentable over Muller in view of Linder for the same reasons as claim 2.

The Examiner also rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Muller in view of Linder and further in view of Extance (U.S. Patent No. 4,919,099). The Examiner argued that the modified Muller reference teaches all of the limitations of claims 1-3, but fails to expressly disclose that the imager is a color imaging cell. However, as noted above, Muller in view of Linder fails to teach or suggest the requirements of amended claim 2. As a result, claim 5 is patentable over Muller in view of Linder and further in view of Extance for the same reason that claim 2 is patentable over Muller in view of Linder.

The Examiner additionally rejected claims 1-3, 7, 8, and 11 under 35 U.S.C. §103(a) as being unpatentable over Durling (U.S. Patent No. 6,359,377). For the reasons set forth below, applicant respectfully traverses this rejection as applied to claim 2.

In rejecting the claims, the Examiner pointed to insulator body 14 shown in FIG. 1 of Durling as constituting the insulating jacket required by claim 2, and fiber optic pressure transducer 24 shown in FIG. 1 of Durling as constituting the imaging structure required by claim 2. Applicant, however, has been unable to find any discussion in Durling that teaches or suggests that fiber optic pressure transducer 24 converts photons into an electrical signal as required by amended claim 2.

Thus, since the Durling reference fails to teach or suggest that pressure transducer 24 converts photons into an electrical signal, claim 2 is patentable over Durling. In addition, since claims 3, 7-8, and 11 depend either directly or indirectly from claim 2, claims 3, 7-8, and 11 are patentable over Durling for the same reasons as claim 2.

The Examiner also rejected claim 5 under 35 U.S.C. §103(a) as being unpatentable over Durling in view of Extance. The Examiner argued that the modified Durling reference teaches all of the limitations of claims 1-3, but fails to expressly disclose that transducer 24 is a color imaging cell. However, as noted above, Durling fails to teach or suggest the requirements of amended claim 2. As a result, claim 5 is patentable over Durling in view of Extance for the same reason that claim 2 is patentable over Durling.

The Examiner further rejected claims 1-2, 8, and 10 under 35 U.S.C. §103(a) as being unpatentable over Ingham in view of Durling. In addition, the Examiner rejected claims 3, 9, 12, and 13 under 35 U.S.C. §103(a) as being unpatentable over Ingham in view of Durling and further in view of Extance et al. For the reasons set forth below, applicant respectfully traverses these rejections.

In rejecting the claims, the Examiner pointed to the Ingham reference as teaching a bore 166 that is formed in outer metal shell 110. The Examiner also pointed to the Durling reference as teaching the placement of a transducer 24 in a hole (reference 18 cited by the Examiner is an electrode) in insulator body 14. The Examiner then appears to argue that it would be obvious to place bore 166 shown in FIG. 1E of Ingham in insulative core 130 of Ingham in view of Durling to facilitate a more accurate pressure profile.

The modification suggested by the Examiner, however, would not produce a more accurate pressure profile. If the pressure waves are always received from a direction that is normal to the surface of pressure sensor 105 in opening 120 shown in FIG. 1E of Ingham, then moving pressure sensor 105 radially inward would appear to have no effect on the detection of a pressure wave. Since no effect is present, any inward movement would not facilitate a more accurate pressure profile.

On the other hand, if the directions of the pressure waves are non-normal, then moving pressure sensor 105 radially inward would appear to increase the interference provided by electrodes 140 and 155 shown in FIG. 1E of Ingham. Since increased interference is present, any inward movement would not facilitate a more

accurate pressure profile. Thus, since moving bore 166 radially inward does not facilitate a more accurate pressure profile, claim 2 is patentable over Ingham in view of Durling. In addition, since claims 8 and 10 depend from claim 2, claims 8 and 10 are patentable over Ingham in view of Durling for the same reasons as claim 2.

Further, the Examiner pointed to column 1, lines 61-64 of Ingham as inherently teaching the presence of an imager. The portion of Ingham cited by the Examiner recites:

“The sensor then is connected to a monitoring circuit, and the output of the monitoring circuit is monitored. For example, the output may be a display of pressure in the combustion cylinder.”

Based on this teaching, the Examiner argues that Ingham inherently teaches the use of an imager.

Applicant, however, has been unable to find any discussion in Ingham that teaches or suggests that the sensor, e.g., pressure sensor 105, converts photons into an electrical signal as required by amended claim 2. In addition, for a limitation to be inherent, the limitation must always be present. In other words, inherency in the present case would require that the sensor always convert photons into electrical signals.

However, rather than teaching that the sensor always convert photons into electrical signals, Ingham does just the opposite with the reference to the use of piezoelectric pressure sensor probes. (See column 1, lines 10-12 of Ingham.) Thus, the Ingham reference does not inherently teach the use of an imager. As a result, claim 2 is patentable over Ingham in view of Durling.

With respect to Extance, the Examiner pointed to column 3, lines 53-57, and column 4, lines 3-11, as teaching an imager. As a result, the Examiner appears to be reading optically conductive rod 14, fiber bundle 12, and transducer assembly 13 to be the imager required by the claims. However, optically conductive rod 14, fiber bundle 12, and transducer assembly 13 can not be read to be the imaging structure

required by amended claim 2 because claim 2 requires that the imaging structure, which is located completely in the hole, convert photons into an electrical signal.

Specifically, optically conductive rod 14 does not appear to be located in a hole in an insulating jacket, but instead appears to be located in a hole in a metal carrier 15. (See column 3, lines 48-49 of Extance.) In addition, applicant has been unable to find any discussion in Extance that teaches or suggests that optically conductive rod 14 or fiber bundle 12 converts photons into an electrical signal. Further, transducer assembly 13 is not located in the hole as required by claim 2.

Thus, since optically conductive rod 14 and fiber bundle 12 do not convert photons into an electrical signal, and transducer assembly 13 is not located in the hole, claim 2 is patentable over Ingham in view of Durling and further in view of Extance. In addition, since claims 3, 9, 12, and 13 depend either directly or indirectly from claim 2, claims 3, 9, 12, and 13 are patentable over Ingham in view of Durling and further in view of Extance for the same reasons as claim 2.


The Examiner objected to claims 4 and 6, but indicated that these claims would be allowable if rewritten to be in independent form to include all of the limitations of the base claim and any intervening claims. Claim 4 has been amended to be in independent form and is believed to include all of the limitations of the base claim and any intervening claims. Claim 6 has not been amended at this time in view of the above discussion.

New claim 21 depends indirectly from claim 2, and is patentable for the same reasons as claim 2. In addition, new claims 22-28 depend either directly or indirectly from claim 4, and are patentable for the same reasons as claim 4.

Thus, for the foregoing reasons, it is submitted that all of the claims are in a condition for allowance. Therefore, the Examiner's early re-examination and reconsideration are requested.

Respectfully submitted,

Dated: 9-21-05

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10/690,181

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APPENDIX A

AMENDMENT IN RESPONSE TO OFFICE
ACTION DATED JUNE 23, 2005

Atty. Docket No. 100-23400
(P05711)



Annotated Marked-Up Drawing

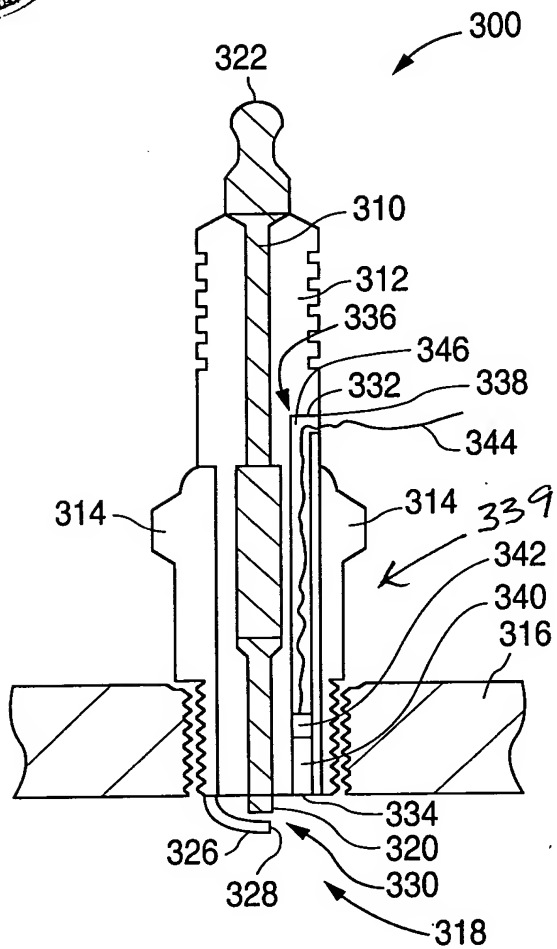


FIG. 3

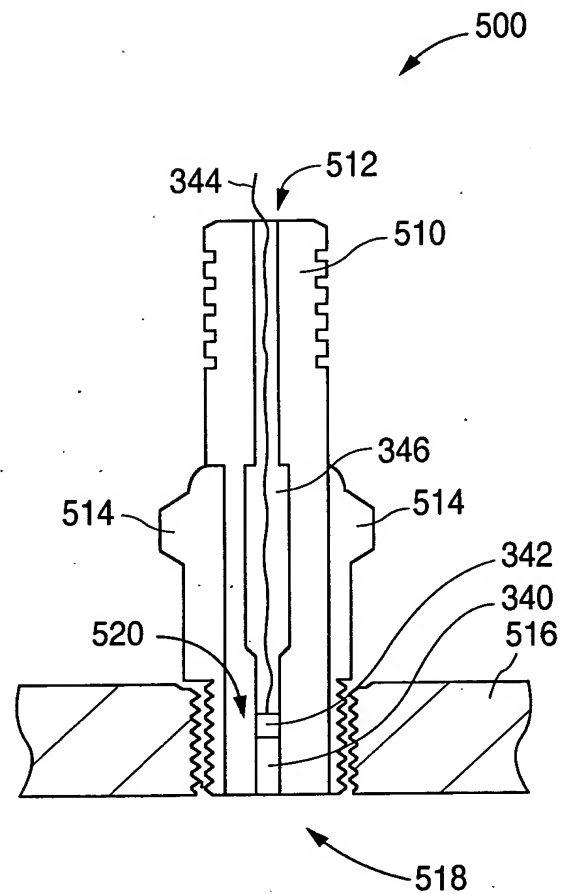


FIG. 5

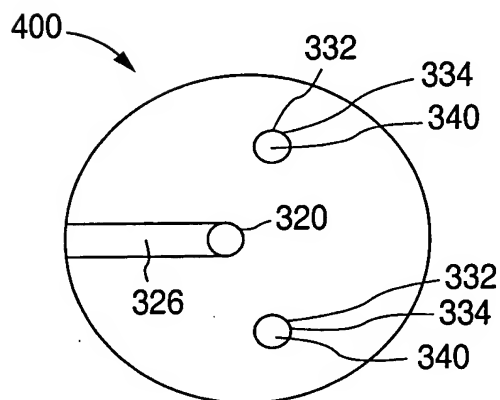


FIG. 4

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APPENDIX B

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(P05711)